LAWRENCE LIVERMORE REPORT

A weekly collection of scientific and technological achievements from Lawrence Livermore National Laboratory: March 17-21, 2008.

Community leaders speak in support of Complex Transformation

At the podium, Director George Miller addresses the crowd during the Livermore public hearing on the NNSA Complex Transformation plan.

Public hearings on the National Nuclear Security Administration's plans to consolidate the nuclear weapons complex, which includes Lawrence Livermore National Laboratory, attracted approximately 200 people scattered over three separate meetings in Tracy and Livermore this week. NNSA held the meetings to take public comment on its preferred alternative to Complex Transformation, its vision for a weapons complex that will be smaller, safer, more secure and less expensive.

Under the preferred alternative, LLNL would be a center of excellence for nuclear design and engineering; a center of excellence for high explosive research and development, with the High Explosives Applications Facility; a science magnet in high-energy-density physics, with the National Ignition Facility; and a platform host site for the Sequoia petascale supercomputer. In addition, most of the Lab's special nuclear material would be removed and consolidated at a more central site.

Approximately 100 individuals -- including Lab Director and Lawrence Livermore National Security President George Miller -- spoke at the three separate hearings. Many of the attendees were out of town activist groups opposing nuclear weapons in general. But Miller and approximately 20 members of the community, including City Council members, business leaders, employees and local residents, spoke in support of the Laboratory and NNSA.

For more, see https://newsline.llnl.gov/community/index.php

For specific changes to the Lab, see
http://www.nnsa.doe.gov/docs/ComplexTrans/LLNL.pdf

New tool to measure explosive power of stars

The large optical image, from the Magellanic Cloud Emission Line Survey (MCELS), shows emission lines of hydrogen (H-alpha) in red, singly ionized sulfur in green and doubly ionized oxygen in blue. The image highlights regions of star formation in the Large Magellanic Cloud, including supernova remnants and giant structures carved out by multiple supernovas.

Astronomers have a new method for studying the power of a supernova explosion. Until now, scientists could only estimate the power of explosions from the light seen soon after a star exploded, or from remnants that are several hundred years old, but not from both.

The new technique, using X-ray and optical observations to observe the remnant of a supernova and a light echo from the initial explosion, may help reveal the details of how some stars come to a cataclysmic death.

The results are the subject of two separate papers that have been accepted in *The Astrophysical Journal*.

For more information, see
https://publicaffairs.llnl.gov/news/news_releases/2008/NR-08-03-06.html

Folic acid may ‘boost’ sperm

Folic acid is found naturally as folate in leafy green vegetables

Prospective fathers should consider taking folic acid supplements to improve their chances of fathering a child, according to research that appears in the latest edition of *The Guardian.* The study, funded by the National Institutes of Health, the Environmental Protection Agency and the U.S. Department of Energy, also was published in *Human Reproduction*, a peer-reviewed medical journal.

A team of scientists from the University of California, Berkeley, as well Lawrence Livermore and Lawrence Berkeley national laboratories, found a link between high levels of the nutrient in men's diets and the genetic quality of sperm. Men with the highest levels had the lowest proportion of sperm harboring genetic changes that can lead to Down's syndrome and miscarriages.

For more, see
http://www.nhs.uk/news/2007/January08/Pages/Folicacidboostssperm.aspx

Lab technology may provide alternative to animal testing

The use of animals in drug testing may be waning, thanks to the rise of microdosing. A major article in the February issue of *The Journal of Life Sciences* discussed how scientists are studying whether the use of microdosing, developed at the Laboratory, and accelerator mass spectrometry (AMS) could be a less expensive and more precise alternative to the use of animals in drug testing.

To read the article, see http://www.tjols.com/article-551.html

New tools for detecting rogue bacteria

New computational tools could become a vital resource for detecting rogue genetically engineered bacteria in environmental samples. Credit: iStockphoto/Sebastian Kaulitzki

Bacteria can be used to engineer genetic modifications, thereby providing scientists with a tool to combat many challenges in areas from food production to drug discovery. However, this sophisticated technology also can be used maliciously, raising the threat of engineered pathogens.

New research by Lab scientists Jonathan Allen, Shea Gardner and Tom Slezak shows that computational tools could become a vital resource for detecting rogue genetically engineered bacteria in environmental samples. The Lab team designed the new tools to identify a set of DNA markers that can distinguish between artificial vector sequences and natural DNA sequences

The research appears in *Science Daily* and *Genome Biology.* For more, see http://www.sciencedaily.com/releases/2008/03/080317191441.htm

U.S. Senator Bob Bennett visits the Lab

Bottom row, left to right, Mark Morrison, Sen. Bennett's legislative director; Lab Director George Miller; Sen. Bob Bennett, Lab Principal Associate Director Ed Moses; Scott O'Malia, Senate Appropriations Committee staff member; and Scott Kopple, NNSA director of congressional affairs. Top, left to right Camille Yuan-Soo Hoo, NNSA Site Office; NNSA Administrator Tom D'Agostino; and Lab Principal Associate Director Bruce Goodwin

U.S. Sen. Bob Bennett and two of his staff members visited the Lab Thursday for briefings and tours.

Bennett, a member of the Senate Energy and Water Development Appropriations Subcommittee, along with deputy chief of staff and legislative director Mark Morrison and staff member Scott O'Malia, heard briefings on the Lab's work in national security, stockpile stewardship, the Advanced Simulation and Computing program, radiation detection, the BioWatch program and climate change.

In addition, they toured the National Atmospheric Release Advisory Center as well as the National Ignition Facility, where they were joined by NNSA Administrator Tom D'Agostino.

To send input to the Livermore Lab Report, send e-mail labreport@llnl.gov.

To view past issues of the Livermore Lab Report, see https://publicaffairs.llnl.gov/news/lab_report/2008index.html